

## **REMARKS**

The last Office Action of June 22, 2001 has been carefully considered. Reconsideration of the instant application in view of the following remarks is respectfully requested.

Claims 1 to 8, 10 and 11 are pending in the application.

Claims 1-5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the admitted prior art to Safyurtlu (CA 1 164 990 A) in view of newly cited U.S. Pat. No. 5,999,554 (hereinafter "Marshall").

Claims 10-11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Safyurtlu and Marshall, and further in view of U.S. Pat. No. 5,699,376 (hereinafter "Richmond").

Claims 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Safyurtlu and Marshall, and further in view of U.S. Pat. No. 6,129,721 (hereinafter "Kataoka").

## **REJECTION UNDER 35 U.S.C. §103(a)**

The rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over Safyurtlu in view of Marshall is hereby traversed and reconsideration thereof is respectfully requested.

Claim 1 is directed to a stable resonator for solid-state lasers, which exhibit a thermally induced lensing effect. The stable resonator includes a laser

rod, a rear mirror and a semi-reflecting output mirror. The rear mirror is convex, the end of the laser rod facing the rear mirror is also convex, and the output mirror is arranged in close proximity to the other end of the laser rod. The output mirror is semi-reflecting. Claims 2-3, 6, and 10 depend from claim 1.

Claim 4 is directed to a stable resonator for solid-state lasers which exhibit a thermally induced lensing effect. The stable resonator includes a laser rod, a rear mirror and a semi-reflecting output mirror. The rear mirror is convex and the end of the laser rod facing the rear mirror is planar. The other end of the laser rod is convex, and the output mirror is formed by the other end of the laser rod, wherein this end is semi-reflecting. Claim 8 depends from claim 4.

Claim 5 is directed to a stable resonator for solid-state lasers wherein unlike claim 4, the output mirror is arranged in close proximity to the other end of the laser rod instead of being formed by the other end of the laser rod. Claims 7 and 11 depend from claim 5.

The Safyurtlu reference discloses an unstable resonator with collimating optics which are bonded together to form an integral assembly with a Q-switch. As best seen from the only Figure, the resonator has a laser gain medium 12 having a partially reflective output surface 14 which acts as a flat resonator element and which operates in conjunction with a convex resonator element 16. Element 20 is the passive Q-switch. Safyurtlu does not teach or suggest that either of the end faces of the laser rod is convex. More particularly, Safyurtlu does not disclose or suggest that the end face of the laser rod facing the convex mirror is convex.

Marshall discloses an end-pumped laser, wherein as best seen from Fig. 11, pump light enters the laser rod through a back mirror 5 which is a convex surface polished onto the end of the laser crystal. This mirror 5 is transmissive in the pump wavelength but highly reflective at the lasing wavelength. (col. 7, line 61 - col. 8, line 17). The Examiner asserts that it would be obvious to combine Marshall's laser rod with Safyurtlu's unstable resonator to arrive at the present invention.

Applicant disagrees. Marshall's [rear] mirror 5 is highly reflective at the lasing wavelength. This is entirely different from the subject matter recited in the independent claims of the instant invention, wherein:

"The rear mirror is convex, the end of the laser rod facing the rear mirror is also convex" (claim 1).

If Marshall's laser rod depicted in Fig. 11 were to be substituted for the laser rod of the instant application, all the laser light generated in the laser rod would be reflected at the end of the laser rod facing the rear mirror rather than at the rear mirror itself, so that the convex rear mirror would not serve the intended function. Moreover, Marshall's mirror 5 operates as a concave mirror surface for the laser light. Marshall clearly states that:

*"The back mirror 5 is a convex surface polished onto the end of the laser crystal, forming a concave mirror surface which focuses return passes of pump light so as to produce a laser mode 8 with a maximum diameter adjacent to the input end 5."* (col. 8, lines 5-9).

Accordingly, a combination of the features disclosed by Safyurtlu and Marshall does not produce the same combination of elements and the same functionality as recited in claim 1.

With respect to claims 4 and 5, these claims recite that "The rear mirror is convex and the end of the laser rod facing the rear mirror is planar" and further that "the other end of the laser rod is convex, and the output mirror is formed by the other end of the laser rod, wherein this end is semi-reflecting. As discussed above, Marshall's mirror 5 is highly reflective at the lasing wavelength. The convex end of the rod hence cannot operate as an output mirror for the laser beam, since output mirrors are known in the art as having a low reflectivity at the lasing wavelength. Accordingly, a combination of the features disclosed by Safyurtlu and Marshall does not produce the same combination of elements and and the same functionality as recited in claims 4 and 5.

In summary, Safyurtlu and Marshall, taken either alone or in combination, do not disclose, teach or suggest the subject matter recited in the independent claims 1, 4 and 5. Accordingly, Applicant respectfully requests that the rejection of claims 1, 4 and 5 be withdrawn.

With respect to the dependent claims 6-8, Kataoka does not teach a convex mirror or a convex end face of the laser rod. Claims 6-8 should therefore be patentable over the references of record for the same reasons that claims 1, 4 and 5 are patentable.

With reference to claim 10-11, Richmond does not supply the element(s) missing from the Safyurtlu and Marshall references, namely that *the rear mirror is*

*convex and the end of the laser rod facing the rear mirror is also convex, as recited in claim 1 from which claim 10 depends, or that the other end of the laser rod is convex and the semi-reflecting output mirror is arranged in close proximity to the other end of the laser rod, as recited in claim 5 from which claim 11 depends.* As discussed above with reference to claim 5, the laser output beam would not reach the semi-reflecting output mirror if Marshall's highly reflective mirror 5 were placed at the other end of the laser rod, and no useful laser beam would be emitted. Accordingly, Applicant respectfully requests that the rejection of claims 10-11 be withdrawn.

For the reasons set forth above, it is applicant's contention that neither Safyurtlu nor Marshall, nor Richmond, nor Kataoka, nor any combination thereof teaches or suggests the features of the present invention, as recited in claims 1, 4 and 5.

As for the rejection of the retained dependent claims, these claims depend on claims 1, 4 and 5 and share their presumably allowable features, and therefore it is respectfully submitted that these claims should also be allowed.

Withdrawal under 35 U.S.C. §103(a) and allowance of claims 1-8, and 10-11 are thus respectfully requested.

## **CONCLUSION**

Applicant believes that when the Examiner reconsiders the claims in the light of the above comments, he will agree that the invention is in no way properly

met or anticipated or even suggested by any of the references however they are considered.

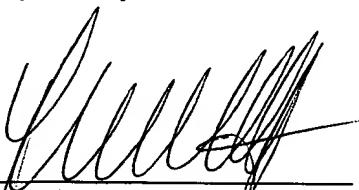
In view of the above presented remarks, it is respectfully submitted that all claims on file should be considered patentably differentiated over the art and should be allowed.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

The Commissioner is hereby authorized to charge fees which may be required, or credit any overpayment to Deposit Account No. 06-0502.

Respectfully submitted,

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